

Claims:

1. A multi-channel acoustic measurement device which comprises:
a plurality of sample chambers,
a controller for controlling one or more conditions of said sample chambers,
5 a plurality of acoustic detectors, each said acoustic detector comprising a piezoelectric crystal and being located in one said sample chamber;
a driving device connected to said plurality of acoustic detectors for causing a perturbation of said acoustic detectors, and
a data device for obtaining data from said acoustic detectors.
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2. A multi-channel acoustic measurement device as claimed in claim 1, wherein the controller controls at least the temperature of said sample chambers.
3. A multi-channel acoustic measurement device as claimed in claim 2, wherein
15 the data device is selected from the group consisting of a data storage device, a data processing device and a combination of a data processing and storage device.
4. A multi-channel acoustic measurement device as claimed in claim 3, wherein said controller is programmable.
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5. A multi-channel acoustic measurement device as claimed in claim 4, further comprising a multiplexer connected between said driving device and said acoustic detectors.
- 25 6. A multi-channel acoustic measurement device as claimed in claim 5, wherein said driving device is selected from the group consisting of an oscillator, a digital data sensitizer and a fourier transform frequency generator.
7. A multi-channel acoustic measurement device as claimed in claim 6, wherein
30 said multiplexer is programmable.
8. A multi-channel acoustic measurement device as claimed in claim 7, further comprising a data validator.

9. A multi-channel acoustic measurement device as claimed in claim 1, further comprising a programmable multiplexer connected between said driving device and said acoustic detectors.

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10. A method for obtaining data from a plurality of samples comprising the steps of:

providing a plurality of sample chambers containing samples,
providing a plurality of acoustic detectors, each said acoustic detector
10 comprising a piezoelectric crystal and being located in one said sample chamber;
driving each said piezoelectric crystal to a resonant frequency, and
measuring at least one property of a plurality of said acoustic detectors.

11. A method as claimed in claim 10, wherein said sample chambers are
15 configured as 96 well plate geometry, and in said providing step, 96 sample chambers are provided.

12. A method as claimed in claim 10, wherein said driving step is carried out according to a pre-programmed control program.

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13. A method as claimed in claim 12, further comprising the step of controlling the temperature of said sample chambers.

14. A method as claimed in claim 13, wherein said temperature control step is
25 carried out according to a pre-programmed control program.

15. A method as claimed in claim 14, further comprising the step of processing at least one measurement obtained in said measuring steps.

30 16. A method as claimed in claim 15, wherein said method provides a measurement selected from the group consisting of a resonant frequency measurement, an amplitude measurement, a phase feedback measurement, a direct decay measurement and a phase frequency spectrum measurement.

17. A method as claimed in claim 16, wherein said method provides information about one or more properties of the acoustic detector selected from the group consisting of resonant frequency change, the rise of the resonant frequency change, onset resonant frequency change, dissipation, the dissipation change, complex impedance, phase change, change in signal amplitude, Q-factor and any combination thereof.
18. A method as claimed in claim 17, wherein said method provides information about the sample selected from the group consisting of mass, visco-elasticity, glass transition temperature, binding factor, biosensor specific concentration, particle size, kinetic cascade patterns, presence of a specific material in the sample and combinations thereof.
19. A method as claimed in claim 18, wherein said processing step comprises processing one or more measurements to adjust for temperature dependence of said one or more measurements.
20. A method as claimed in claim 10, wherein said piezoelectric crystals comprise crystals selected from the group consisting of quartz crystals and gallium phosphide crystals.
21. A method as claimed in claim 20, wherein said driving step comprises oscillating said piezoelectric crystals using a multiplexed output from an oscillator circuit.